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by

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Measurement of Product Contamination in the Air (H. M. Parker, Pfc T. W. Bloss, T/4 D. J. Rendell)

In CH-1619, p.14, and again in the following monthly report, it has been shown that attempts to measure product contamination in air by electrostatic precipitation methods or otherwise will be obscured by the collection of active deposit of radium and thorium.

In brief, a proposed tolerance level for product in air is $\sim 3 \times 10^{-17}$ curie/cc. One is therefore concerned with the measurement of levels about one-tenth of this; ie $\sim 10^{-18}$ to 5×10^{-18} curie/cc. The radon concentration found by precipitator methods has ranged from 10^{-17} to 5×10^{-16} curie/cc. (Accepted range is 2×10^{-17} to 10^{-15} curie/cc.) Thoron concentration has ranged from 8×10^{-19} to 10^{-17} curie/cc. It is evident that an initial collection could show predominantly the active deposits. The radium active deposit decays to negligible values in 6 hours. Unless a continuous monitoring or quick reading is required, the radium effect can be avoided.

The thorium active deposit is troublesome, because of the 10.6 hour half-life. Provisionally, this laboratory has made one reading 6 hours after collection and another 2 days later to correct for the thorium active deposit background. The precipitators used pull 11-1/2 c.ft./min. at about 70% efficiency. Good counting rates are obtained in a 30 minute run. There is some indication that the quantitative results are affected by line voltage or the nature of the point discharge.

Representative values of product concentration are:

706-A Bldg.

Room 54	values from 4×10^{-11} to 2×10^{-9} μg/cc.
Room 21	1.5×10^{-11} μg/cc.
Room 20	10^{-8} μ g/cc.
Room 19	1.5×10^{-11} μ g/cc.
Room 4	5×10^{-10} μ g/cc.
Room 2	10^{-11} μg/cc.

205 Bldg.

Room D	1.5×10^{-12} to 5×10^{-10} μg/cc.
Room C	2.5×10^{-11} μ g/cc.
Control Lab.	1×10^{-11} to 5×10^{-11} μg/cc.

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The tolerance concentration is provisionally considered to be 5×10^{-10} μg/cc.

Pluto has been used profitably throughout the building to locate alpha contamination. In general Pluto goes off-scale when he reacts at all, but this does not affect his value. Full scale reading presumably indicates about 10^{-2} μg/cm^2 of contaminated surface. Mopping of floors and subsequent varnishing has been the procedure to deal with local spills.

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